AMENDMENTS TO THE CLAIMS

Please cancel Claim 23; amend Claims 1-22 and 24-33; and add new Claims 34-36 as follows.

LISTING OF CLAIMS

1. (previously presented) A vehicle suspension system having a damping and stiffness system for a vehicle, the vehicle including a vehicle body and a first pair and a second pair of diagonally spaced wheel assemblies, the first pair of diagonally spaced wheel assemblies including at least one front left wheel assembly and at least one back right wheel assembly, the second pair of diagonally spaced wheel assemblies including at least one front right wheel assembly and at least one back left wheel assembly, the vehicle suspension system also including front and rear vehicle resilient support means between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, the damping and stiffness system including:

at least one wheel ram located between each wheel assembly and the vehicle body, each ram including at least a compression chamber;

a load distribution unit interconnected between the compression chambers of the front left, front right, back left and back right wheel rams, the load distribution unit including first and second piston rod assemblies, first, second, third and fourth system volumes and first and second modal resilience volumes,

the first piston rod assembly defining first, second, third and fourth effective areas, the second piston rod assembly defining fifth, sixth, seventh and eighth effective areas, the first and second piston rod assemblies being located within

the load distribution unit such that each piston rod assembly can rotate about and slide along a major axis of the piston rod assembly,

the first effective area defines a movable wall of the first system volume such that as the first piston rod assembly slides along its major axis, the volume of the first system volume varies, the second effective area defines a moveable wall of the second system volume, the third effective area defines a movable wall of the first modal resilience volume, the fourth effective area defines a movable wall of the second modal resilience volume, the fifth effective area defines a movable wall of the third system volume such that as the second piston rod assembly slides along its major axis, the volume of the third system volume varies, the sixth effective area defines a moveable wall of the fourth system volume, the seventh effective area defines a movable wall of the first modal resilience volume, and the eighth effective area defines a movable wall of the second modal resilience volume,

the first system volume increasing in volume proportionately to the decrease in volume of the second system volume with motion of the first piston rod assembly, the third system volume increasing in volume proportionately to the decrease in volume of the fourth system volume with motion of the second piston rod assembly,

the volume of the first modal resilience volume decreasing proportionately to the increase in volume of the first and third system volumes with motion of the first and second piston rod assemblies, the volume of the second modal resilience volume decreasing proportionately to the increase in volume of the second and fourth system volumes,

the first and fourth system volumes being connected to the compression chambers of the wheel rams associated with one of the pairs of diagonally spaced wheel assemblies, the second and third system volumes being connected to the compression chambers of the wheel rams associated with the other pair of diagonally spaced wheel assemblies, the damping and stiffness system thereby providing substantially zero warp stiffness; and

wherein the vehicle is primarily supported by the vehicle resilient support means which is functionally separate from the damping and stiffness system.

2. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 1 further including a pressure maintenance device connected in fluid communication to the first, second, third and fourth system volumes to maintain the static pressure of said system volumes at a substantially common pressure.

3. (currently amended) A vehicle suspension system having a damping and stiffness system as claimed in claim 2 wherein the pressure maintenance device is further connected in fluid communication to the first and second modal ~~stiffness~~ resilience volumes to maintain the static pressure of the modal resilience volumes at substantially the same common pressure.

4. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 1 wherein the first system volume is connected to the compression chamber of the at least one wheel ram associated with

the at least one front left wheel assembly, the second system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one back left wheel assembly, the third system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one front right wheel assembly and the fourth system volumes is connected to the compression chamber of the at least one wheel ram associated with the at least one back right wheel assembly,

the first modal resilience volume thereby being a front bump resilience volume and the second modal resilience volume thereby being a back bump resilience volume, the front and back bump resilience volumes thereby providing the damping and stiffness system with additional pitch resilience, independent of the roll and heave stiffness of the damping and stiffness system.

5. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 1 wherein the first system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one front left wheel assembly, the second system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one front right wheel assembly, the third system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one back left wheel assembly and the fourth system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one back right wheel assembly,

the first modal resilience volume thereby being a left roll resilience volume and the second modal resilience volume thereby being a right roll resilience volume; the left and right roll resilience volumes thereby providing the damping and stiffness system with additional roll resilience, independent of the pitch and heave stiffness of the damping and stiffness system.

6. (previously presented) A vehicle suspension system having a damping and stiffness system for a vehicle, the vehicle including a vehicle body and at least two forward and two rearward wheel assemblies, the vehicle suspension system also including front and rear vehicle resilient support means between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, the damping and stiffness system including:

at least two front and two rear wheel rams located between the wheel assemblies and the vehicle body, each ram including at least a compression chamber;

a load distribution unit, includes a first pair of axially aligned primary chambers and a second pair of axially aligned primary chambers, each primary chamber including a piston separating each primary chamber into two secondary chambers, a first rod connecting the pistons of the two first primary chambers,

forming a first piston rod assembly and a second rod connecting the pistons of the two second primary chambers forming a second piston rod assembly,

one of the secondary chambers in the first pair of primary chambers being a first front system chamber and being connected to the compression chamber of a front wheel ram on a first side of the vehicle,

the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first front system chamber with motion of the first piston rod assembly, being a first back pitch chamber,

one of the secondary chambers in the first pair of primary chambers which varies in volume in the opposite direction as the first front system chamber with motion of the first piston rod assembly being a first back system chamber and being connected to the compression chamber of a back wheel ram on a first side of the vehicle,

the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first back system chamber with motion of the first piston rod assembly, being a first front pitch chamber,

one of the secondary chambers in the second pair of primary chambers being a second front system chamber and being connected to the compression chamber of a front wheel ram on a second side of the vehicle,

the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second front system chamber with motion of the second piston rod assembly, being a second back pitch chamber,

one of the secondary chambers in the second pair of primary chambers which varies in volume in the opposite direction as the second front system chamber with motion of the second piston rod assembly being a second back system chamber and being connected to the compression chamber of a back wheel ram on a second side of the vehicle,

the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second back system chamber with motion of the second piston rod assembly, being a second front pitch chamber, and

the first and second front pitch chambers being interconnected forming a front pitch volume and the first and second back pitch chambers being interconnected forming a back pitch volume;

wherein the vehicle is primarily supported by the vehicle resilient support means which is functionally separate from the damping and stiffness system.

7. (previously presented) A vehicle suspension system having a damping and stiffness system for a vehicle, the vehicle including a vehicle body and at least two forward and two rearward wheel assemblies, the vehicle suspension system also including front and rear vehicle resilient support means between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, the damping and stiffness system including:

a load distribution unit, including a first pair of axially aligned primary chambers and a second pair of axially aligned primary chambers, each primary chamber including a piston separating each primary chamber into two secondary chambers, a first rod connecting the pistons of the two first primary chambers, forming a first piston rod assembly and a second rod connecting the pistons of the two second primary chambers forming a second piston rod assembly,

one of the secondary chambers in the first pair of primary chambers being a front left system chamber and being connected to the compression chamber of a front wheel ram on a left side of the vehicle,

the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the front system chamber with motion of the first piston rod assembly, being a first right roll chamber,

one of the secondary chambers in the first pair of primary chambers which varies in volume in the opposite direction to the front left system chamber with motion of the first piston rod assembly being a front right system chamber and being connected to the compression chamber of the other front wheel ram on a right side of the vehicle,

the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the front right system chamber with motion of the first piston rod assembly, being a first left roll chamber,

one of the secondary chambers in the second pair of primary chambers being a back left system chamber and being connected to the compression chamber of a back wheel ram on the left side of the vehicle,

the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the back left system chamber with motion of the second piston rod assembly, being a second right roll chamber,

one of the secondary chambers in the second pair of primary chambers which varies in volume in the opposite direction as the second front system chamber with motion of the second piston rod assembly being a back right system chamber and

being connected to the compression chamber of a back wheel ram on the right side of the vehicle,

the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the back right system chamber with motion of the second piston rod assembly, being a second left roll chamber, and

the first and second left roll chambers being interconnected forming a left roll volume and the first and second right roll chambers being interconnected forming a right roll volume;

wherein the vehicle is primarily supported by the vehicle resilient support means which is functionally separate from the damping and stiffness system.

8. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 6 wherein the wheel rams of at least the two front or the two rear wheel rams are single-acting rams.

9. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 8 wherein each single-acting wheel ram includes a piston dividing the ram into a compression and a rebound chamber, damping being provided in the piston of the ram to provide at least a rebound damping force.

10. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 8 wherein the wheel rams at one end of the vehicle are double-acting wheel rams further including a rebound chamber, the

rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram.

11. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 6 wherein each wheel ram is a double-acting ram further including a rebound chamber, the rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram.

12. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 1 wherein the compression chamber of each of at least two of said wheel rams may be in fluid communication with a respective accumulator.

13. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 6 wherein the front pitch volume is connected to the back pitch volume through a pitch valve arrangement.

14. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 13 wherein the pitch valve arrangement includes at least one pitch damper valve to provide pitch damping.

15. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 14 wherein the at least one pitch damper valve is a variable damper valve.

16. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 14 wherein the pitch valve arrangement further includes a bypass passage and a bypass valve, the bypass passage being connected to either side of the at least one pitch damper valve, the bypass valve being located in the bypass passage and being switchable to enable or disable the pitch damping.

17. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 6 wherein the front pitch volume is connected to a front pitch accumulator through a front pitch damper valve and the back pitch volume may be connected to a back pitch accumulator through a back pitch damper valve, the front and back pitch accumulators provide additional pitch resilience in the stiffness and damping system.

18. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 17 wherein at least one of the front and rear pitch damper valves is a variable damper valve.

19. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 17 wherein the front pitch volume is connected to the back pitch volume by a pitch stiffness valve.

20. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 19 wherein the pitch stiffness valve is a damper valve.

21. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 19 wherein the pitch stiffness valve is a lockout valve to isolate the front pitch volume from the back pitch volume.

22. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 6 wherein a roll valve is provided to interconnect at least one of the compression chambers of the at least two front wheel rams and the compression chambers of the at least two back wheel rams.

23. (cancelled)

24. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 6 further including a pressure maintenance device connected in fluid communication to at least four of the secondary chambers in the load distribution unit by respective pressure maintenance passages to maintain the static pressure of said at least four secondary chambers at a substantially common pressure.

25. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 24 further including a valve in each pressure maintenance passage.

26. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 24 further including a restriction in each pressure maintenance passage.

27. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 24 wherein the pressure maintenance device includes a fluid pressure source.

28. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 24 wherein the pressure maintenance device includes an accumulator.

29. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 27 wherein the pressure maintenance unit is controlled to regulate the static pressure in the at least four secondary chambers to a preset pressure.

30. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 29 wherein the preset pressure can be varied.

31. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 6 further including a pressure maintenance device, the pressure maintenance device including a first and a second output pressure, the first output pressure being connected to the first front, second front, first back and second back system chambers of the load distribution unit by respective system pressure maintenance passages, the second output pressure being connected to the front pitch volume and the back pitch volume by respective pitch pressure maintenance passages.

32. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 31 wherein the pressure maintenance device includes a fluid pressure source, the pressure in the system chambers being controlled to a first preset pressure, the pressure in the pitch volumes being controlled to a second preset pressure, the first preset pressure being variable to vary the roll stiffness of the damping and stiffness system separately to the pitch stiffness, the second preset pressure being variable to vary the pitch stiffness of the damping and stiffness system.

33. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 2 further including resilient centering devices to provide a centering force on the piston rod assemblies in the load distribution unit to bias the piston rod assemblies towards a mid-stroke position.

34. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 7 further including a pressure maintenance device connected in fluid communication to at least four of the secondary chambers in the load distribution unit by respective pressure maintenance passages to maintain the static pressure of said at least four secondary chambers at a substantially common pressure.

35. (previously presented) A vehicle suspension system having a damping and stiffness system as claimed in claim 7 wherein the wheel rams of at least the two front or the two rear wheel rams are single-acting rams.

36. (previously presented) A vehicle suspension system having a damping and stiffness system according to claim 7 wherein each wheel ram is a double-acting ram further including a rebound chamber, the rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram.